UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
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ART UNIT	PAPER NUMBER
2625	

DATE MAILED: 01/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-24_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-4,6-18 and 22-24_ is/are rejected.

7)☐ Claim(s) _5 and 19-21_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _31 January 2001_ is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application)
since a specific reference was included in the first sentence of the specification or in an Application Data Sheet.
37 CFR 1.78.

    a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific
reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)   4) ☐ Interview Summary (PTO-413) Paper No(s). _____.

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)   5) ☐ Notice of Informal Patent Application (PTO-152)

3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.   6) ☐ Other: .

DETAILED ACTION

Drawings

1.   The drawings are objected to because **all the figures** contain handwritten notation that is difficult to read. Also, consider replacing "M(loc2)" in **Fig 4** with --m(loc2)--. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

2.   The disclosure is objected to because of the following informalities:

On page 3, line 18, consider changing "falling" to --fall--;

On page 4, line 8, consider changing "(g)" to --M(g)--;

On page 4, in the function for f(g), consider changing "*wl*" to --w1-- (the letter "*l*" to the number "1");

On page 5, line 3, consider changing "520" to --530--.

On page 5, line 4, consider changing "$2^8 = 255$" to --$2^8 - 1 = 255$--;

In the equations for m(g) on pages 5 and 6, consider replacing the "*x*" indicating multiplication to something less similar to the variable "*x*" used on page 5, line 2;

In the equation for m(g) on page 6, consider replacing "*mas(g)*" with --*max(g)*--.

Appropriate correction is required.

Claim Objections

3.   **Claims 9, 10, 11** are objected to because of the following informalities: In regards to

claim 9, on the second line after the equation, consider replacing "widts" with --widths--. In

regards to **claims 10 and 11**, in the equations for m(g), consider replacing the "x" indicating

multiplication to something less similar to the variable "x" used on page 5, line 2. Furthermore,

in regards to **claims 10 and 11**, in the equation for m(g), consider replacing "*mas(g)*" with --

max(g)--.

        Appropriate correction is required.

Claim Rejections - 35 USC § 112

4.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making
> and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it
> pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode
> contemplated by the inventor of carrying out his invention.

5.   **Claims 18 and 22** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply

with the enablement requirement. The claim(s) contains subject matter which was not described

in the specification in such a way as to enable one skilled in the art to which it pertains, or with

which it is most nearly connected, to make and/or use the invention.

6.   In regards to **claim 18**, the specification is non-enabling e.g. for $n = 1.5$ or $n = 2.3$.

Consider amending to include something similar to --where n is an integer--.

7.   A similar argument can be made for **claim 22**, line 3. Consider including --where n is an

integer less than--.

8.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9.   **Claims 9, 10, 11, and 16-18** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10.   **Claim 9** recites the limitation "g" in the equation for f(g). There is insufficient antecedent basis for this limitation in the claim. Consider including something similar to --where g is a grey level--. See specification, page 4, line 20.

11.   **Claim 10** recites the limitation "the mapping curve" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. Consider amending claim 9, line 3, to reflect the mapping curve.

12.   **Claim 11** recites the limitation "the mapping curve" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. Furthermore, claim 11 does not recite the relationship of the "mapping curve" comprised in the claim 11 scaling step to the "mapping function" recited in the claim 1 scaling step.

13.   **Claim 11** recites the limitation "g" in the equation for m(g). There is insufficient antecedent basis for this limitation in the claim. Consider including something similar to --where g is an original grey level--. See specification, page 5, line 7.

14.   **Claim 16** recites the limitation "the image histogram" in line 3 of the claim. There is insufficient antecedent basis for this limitation in the claim. Consider using --the original image histogram--.

15.   **Claims 17-18** inherit indefinite language by dependency on claim 16.

Claim Rejections - 35 USC § 102

16.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

17.   **Claims 1, 6, 7, 12, 13, 23, and 24** are rejected under 35 U.S.C. 102(b) as being

anticipated by Zwirn et al (U.S. Patent 4,445,138, newly cited, "Zwirn").

18.   In regards to **claim 1**, Zwirn discloses a method comprising: obtaining a signal (col 5,

lines 11-25) indicative of an image; forming an original histogram (col 5, line 27) indicative of

the signal, said histogram including information indicative of numbers of dynamic range levels

(col 6, lines 4-11) in the signal; forming a mapping function (col 5, line 50), which relates each

dynamic range level to positions of peaks in the original histogram (col 6, line 57 – col 7, line

14); and scaling (col 7, lines 3-24) each original histogram based on said mapping function.

Note that the mapping function of Zwirn maps groups of dynamic range levels to

positions of peaks in the original histogram (e.g. col 7, line 5, "all intensity levels from intensity

level 1 to intensity level 31 are mapped into intensity level 20", where in Fig 2, intensity level 20

is a peak). The scaling occurs in each subsequent frame (col 7, line 25), when a particular

intensity level of the applied signals becomes mapped to one of the 10 peak intensity levels (col

7, line 30), thus each particular intensity level is scaled to one of the 10 peak intensity levels.

19.   In regards to **claim 6**, Zwirn further discloses in col 7, lines 25-40, the method further comprising forming a new histogram based on said scaling, and in col 7, line 62, displaying an image based on said new histogram.

20.   In regards to **claim 7**, Zwirn further discloses in col 5, line 20, the method wherein said obtaining an image comprises using an active pixel sensor to obtain an image.

21.   In regards to **claim 12**, Zwirn further discloses in col 4, lines 52-54, the method wherein said mapping function has a form that preserves relative brightness of a transformed image.

22.   In regards to **claim 13**, Zwirn further discloses in col 4, lines 52-54 and col 7, lines 25-40, the method wherein the new histogram has peaks in proportional locations to those in the original histogram, and a relationship between heights of said peaks of the new histogram is the same as a relationship between heights of peaks in the original histogram.

23.   In regards to **claim 23**, Zwirn discloses a method comprising: obtaining (col 5, lines 11-25) a higher dynamic range signal; forming a histogram (col 5, line 27) between components of the signal indicative of dynamic range levels in the signal, and numbers of those dynamic range levels; finding peaks (col 6, line 57 – col 7, line 14) in said histogram; and transforming (col 7, lines 3-24) said histogram into a modified histogram which keeps a similar specified relationship between said peaks and which represents a lower dynamic range signal.

24.   In regards to **claim 24**, Zwirn further discloses in col 7, lines 3-24, the method wherein said transforming comprises forming a mapping function based on the original histogram, and using said mapping function to form a modified histogram.

25.   **Claims 1-4, 6-8, 12-17, and 22-24** are rejected under 35 U.S.C. 102(e) as being

anticipated by Schwenker et al (U.S. Patent 6,215,900 B1, newly cited, "Schwenker").

26.   In regards to **claim 1**, Schwenker discloses a method comprising: obtaining a signal (col

3, lines 33-39) indicative of an image; forming an original histogram (Fig 2 and col 4, lines 31-

34) indicative of the signal, said histogram including information indicative of numbers of

dynamic range levels (col 4, line 30) in the signal; forming a mapping function (histogram

integral, col 4, lines 54-61), which relates each dynamic range level to positions of peaks in the

original histogram; and scaling (col 5, lines 45-55) each original histogram based on said

mapping function.

27.   In regards to **claim 2**, Schwenker further discloses in Fig 2, the method wherein said

mapping function (integral) forms a curve which has areas of highest slope near said peaks in

said original histogram.

28.   In regards to **claim 3**, Schwenker further discloses in Fig 2, the method wherein there are

two of said peaks.

29.   In regards to **claim 4**, Schwenker further discloses in Fig 2 and col 4, lines 54-61, the

method wherein said forming a mapping function comprises determining center portions of said

peaks, and characterizing dynamic range levels based on their relationship with said center

portions of said peaks.

30.   In regards to **claim 6**, Schwenker further discloses in col 8, lines 8-21, the method further

comprising forming a new histogram based on the scaling, and displaying an image based on

said new histogram.

31.   In regards to **claim 7**, Schwenker further discloses in col 3, lines 33-39, the method

wherein said obtaining an image comprises using an active pixel sensor to obtain an image.

32.   In regards to **claim 8**, Schwenker further discloses in Fig 2, the method wherein said

mapping function is monotonous.

33.   In regards to **claim 12**, Schwenker further discloses in col 3, lines 1-12, the method

wherein said mapping function has a form that preserves relative brightness of a transformed

image.

34.   In regards to **claim 13**, Schwenker further discloses in col 8, lines 8-21, the method

wherein the new histogram has peaks in proportional locations to those in the original histogram,

and a relationship between heights of said peaks of the new histogram is the same as a

relationship between heights of peaks in the original histogram.

35.   In regards to **claim 14**, Schwenkwer discloses an apparatus comprising: an image

acquisition element (col 3, lines 33-39), obtaining an original signal indicative of an image of a

scene; and a processor, modifying (Fig 4) said original signal to produce a modified signal,

wherein the modified signal has fewer levels of dynamic range than the original signal, said

processor operating by calculating an original image histogram (Fig 2 and col 4, lines 31-34),

calculating a mapping function (col 6, lines 10-39) for the original image histogram which

comprises a monotonous function (Fig 2, integral) having changes in said function which occur

predominately at areas of peaks in said original image histogram, and forming a new compressed

histogram (col 8, lines 8-21) based on said mapping function.

36.   In regards to **claim 15**, all the additional elements set forth in this claim have been

addressed in the argument of claim 7.

37.   In regards to **claim 16**, Schwenker further discloses the apparatus wherein said processor

forms a mapping curve (Fig 2 and col 5, lines 15-27, histogram integral) which has areas of

highest change near said areas of peaks in the original image histogram.

38.   In regards to **claim 17**, all the additional elements set forth in this claim have been

addressed in the argument of claim 3.

39.   In regards to **claim 22**, Schwenker further discloses in col 4, lines 13-22, the apparatus

further comprising a display device, having the capability of displaying n levels, where n is less

than a number of levels in the original image.

40.   In regards to **claim 23**, Schwenker discloses a method comprising: obtaining (col 3, lines

33-39) a higher dynamic range signal; forming a histogram (Fig 2 and col 4, lines 31-34)

between components of the signal indicative of dynamic range levels in the signal, and numbers

of those dynamic range levels; finding peaks (Fig 2 and col 4, lines 54-61) in said histogram; and

transforming (col 8, lines 8-21 and Fig 4) said histogram into a modified histogram which keeps

a similar specified relationship between said peaks and which represents a lower dynamic range

signal.

41.   In regards to **claim 24**, Schwenker further discloses in col 8, lines 8-21 and Fig 4, the

method wherein said transforming comprises forming a mapping function based on the original

histogram, and using said mapping function to form a modified histogram.

Claim Rejections - 35 USC § 103

42.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

43. **Claims 3** are rejected under 35 U.S.C. 103(a) as being unpatentable over Zwirn et al

(U.S. Patent 4,445,138, cited above, "Zwirn").

44. In regards to **claim 3**, Zwirn does not expressly disclose the method wherein there are

two of said peaks.

However, Zwirn does disclose 10 peaks (Fig 2) where the number of peaks is display

device dependent (col 6, line 5).

It would have been obvious to one of ordinary skill in the art at the time of the invention

to use only two peaks instead of Zwirn's 10, in the event that a display device could reproduce

only two intensity levels. Applicant has not disclosed that two peaks provides an advantage, is

used for a particular purpose, or solves a stated problem. One of ordinary skill in the art,

furthermore, would have expected Applicant's invention to perform equally well with 10 peaks

because Applicant claims n peaks in claim 18, where n is assumed to be any integer.

Therefore, it would have been obvious to one of ordinary skill in the art to modify Zwirn

to obtain the invention as specified in claim 3.

45. **Claims 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwenker et

al (U.S. Patent 6,215,900 B1, newly cited, "Schwenker").

46. In regards to **claim 18**, Schwenker does not expressly disclose the method wherein there

are n of said peaks, where n is an integer.

However, Schwenker does disclose two peaks (Fig 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use n peaks instead of Schwenker's two. Applicant has not disclosed that n peaks provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected Applicant's invention to perform equally well with two peaks because Applicant claims two peaks in claim 17.

Therefore, it would have been obvious to one of ordinary skill in the art to modify Schwenker to obtain the invention as specified in claim 18.

Allowable Subject Matter

47.   **Claims 5 and 19-21** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

48.   **Claims 9-11** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten to overcome the claim objections and rejections under 35 USC 112, 2nd paragraph, in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

49.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher T. Sukhaphadhana whose telephone number is 703-306-4148. The examiner can normally be reached on 9a-4p M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Bhavesh M. Mehta can be reached on (703) 308-5246. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the receptionist whose telephone number is 703-305-3800.

CTS

CTS

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